14, 15, 19, 20, 24, and 25 stand rejected under 35 U.S.C. 103(a) as applied to their respective independent claims further in view of Kollanyi (US Patent 4,893,002). Applicants thank the Examiner for his attention to the application.

In the Office action, claim 16 is objected to because of an informality. Accordingly, claim 16 has been amended to replace the phrase "A method apparatus" to a "A method."

In the Office action, claims 5-7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Accordingly, claim 5 has been rewritten in independent form including all of the limitations of claims 1-4. With regard to dependent claims 6, and 7, each of these claims are dependent from amended claim 5 and therefore include all the limitations of amended claim 5 and additional limitations in each dependent claim. Accordingly, claims 6 and 7 are also allowable for the same reason set forth above for claim 5 as well as the additional limitations recited therein.

In the Office action, claims 12 and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Accordingly, claim 12 has been rewritten in independent form including all of the limitations of claim 11. With regard to dependent claim 13, claim 13 is dependent from amended claim 12 and therefore includes all the limitations of amended claim 12 and additional limitations. Accordingly, claim 13 is also allowable for the same reason set forth above for claim 12 as well as the additional limitations recited therein.

In the Office action, claims 17 and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Accordingly, claim 17 has been

rewritten in independent form including all of the limitations of claim 16. With regard to dependent claim 18, claim 18 is dependent from amended claim 17 and therefore includes all the limitations of amended claim 17 and additional limitations. Accordingly, claim 18 is also allowable for the same reason set forth above for claim 17 as well as the additional limitations recited therein.

In the Office action, claim 22 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Accordingly, claim 22 has been rewritten ~~in independent form including all of the limitations of claim 21~~.

Claims 1-4, 8-11, 16, 21, and 23 stand rejected under U.S.C. 103(a) as being unpatentable over Geller in view of Lim and further in view of Lemon et al. Geller is directed to a optical receiver having means for switching between first and second amplifier configurations (Geller, col. 5 lines 42-46). In Geller, the output of a photodiode 12 is coupled to a RC circuit, composed of a resistor 32 and a capacitor 34, which is further coupled to a buffer amplifier 14 and a switching control circuit (Geller, col. 3, line 27-28). The switching control circuit is disclosed as having a comparator 36 for generation of a control output 38. The control output is used to select between separate amplification circuits 24 and 16 (Geller, col. 3, line 67 to col. 4, line 30). Lim discloses an optical receiver circuit having a photodetector 32 AC coupled to a transimpedence amplifier 48 (Lim, col. 4, line 4-6). Lemon discloses a Loss of Incoming Signal (LIS) circuit composed of a comparator 624 whose inputs are coupled to a signal representing the average peak amplitude voltage of the data signal and a comparison reference voltage signal (Lemon, col. 14, lines 24-35). The Office action indicates that it would have been obvious to one of ordinary skill in the art to modify the switching control circuit of Geller by adding the AC coupled

transimpedence amplifier of Lim and the comparator of Lemon to arrive at the LOS circuit as claimed in claim 1.

It is respectfully submited that the modification of the switching control circuit of Geller in light of Lim and further in light of Lemon as stated in the Office action does not disclose all of the limitations of Applicants' LOS circuit as claimed in claim 1. Applicants claim a loss of signal circuit in an opto-electronic receiver, the opto-electronic receiver having a transimpedance amplifier **ac** coupled to a photodetector **and** a current to voltage circuit **dc** coupled to the photodetector. In contrast, the switching control circuit of Geller is coupled to the same RC circuit signal as the buffer amplifier, appears be no separate **ac and dc** coupled circuits as in Applicants' claim 1. In neither Lim nor in Lemon are there any discussions of a dc coupled circuit, separate from an ac coupled circuit, used for the purpose of developing a LOS signal. In Lim, there appears to be no discussion of any LOS provision at all. In Lemon, the LIS signal is generated using the **data signal**, which is an information carrying dc coupled signal, instead of a separate dc signal taken directly from a photodetector. Therefore, as neither Geller, nor Lim, nor Lemon disclose a **dc coupled circuit separate from an ac coupled circuit** as in Applicants' claim 1, the combination of Geller, Lim, and Lemon cannot be said to disclose all of the limitations of Applicants' claim 1.

Furthermore, it is submitted that modification of the switching control circuit of Geller as suggested in the Office action is improper as such a modification would render the switching control circuit of Geller inoperable to perform its intended function. The switching control circuit of Geller functions to select between two separate amplification stages for the optical receiver depending on the level of the output signal of a photodector (Geller, col. 2, lines 31-34). As such, the switching control circuit generates a binary signal representing two separate photodetector output signal levels

wherein each photodetector output signal level is still suitable for use, albeit at different amplification levels (Geller, col. 4, line 27- col. 5, line 5). To function as a LOS signal generator, the switching control circuit would have to be modified such that it generated a binary LOS signal wherein one level of the LOS signal indicates a signal no longer suitable for use regardless of the amplification level. As such, the switching control circuit would no longer be able to select amplifiers used for suitable signals.

With regard to dependent claims 2-4, each of these claims are dependent from claim 1 and therefore include all the limitations of claim 1 and additional limitations in each dependent claim. Accordingly, claims 2-4 are also allowable for the same reason set forth above for claim 1 as well as additional limitations recited. Specifically, with regard to claims 3 and 4, the Office states that the sensing resistor 32 of Geller "could" provide a substrate signal or be used to provide process and temperature information. Neither Geller, Lim, nor Lemon disclose nor suggest that the sensing resistor could function as a substrate drive signal or provide of process and temperature information.

With regard to claim 8, Applicants claim an opto-electronic receiver comprising a photodetector, a signal amplifier **ac coupled** to the photodetector, and a loss of signal circuit **dc coupled** to the photodetector. It is submitted that reasoning similar to claim 1 as stated above applies to claim 8. Specifically, as neither Geller, nor Lim, nor Lemon disclose a **dc coupled** loss of signal circuit **separate** from an **ac coupled** signal amplifier as in Applicants' claim 8, the combination of Geller, Lim, and Lemon cannot be said to disclose all of the limitations of Applicants' claim 8.

With regard to dependent claims 9 and 10, each of these claims are dependent from claim 8 and therefore include all the limitations of claim 8 and additional limitations in each dependent claim.

Accordingly, claims 9 and 10 are also allowable for the same reason set forth above for claim 8 as well as additional limitations recited.

With regard to claim 11, Applicants claim an apparatus for generating a Loss Of Signal (LOS) signal for a photodetector circuit included in an opto-electronic receiver, the photodetector circuit being **AC coupled to an amplifier stage** included in the opto-electronic receiver, the photodetector circuit generating a **DC signal** responsive to an optical signal. The LOS signal generating apparatus comprises a current to voltage converter circuit receiving the **DC signal** from the photodetector circuit, the current to voltage converter circuit generating a voltage signal in response to the **DC signal** and a comparator circuit receiving the voltage signal from the current to voltage converter circuit, the comparator circuit generating the LOS signal in response to the voltage signal. It is submitted that the reasoning with regard to claim 1 as stated above applies to claim 11. Specifically, as neither Geller, nor Lim, nor Lemon disclose a photodetector circuit being **AC coupled to an amplifier stage** and generating a **DC signal** used by a LOS signal generating apparatus to generate a LOS signal as in Applicants' claim 11, the combination of Geller, Lim, and Lemon cannot be said to disclose all of the limitations of Applicants' claim 11.

With regard to claim 16, Applicants claim a method for generating a Loss Of Signal (LOS) signal for a photodetector circuit included in an opto-electronic receiver with the photodetector circuit **AC coupled to an amplifier stage** included in the opto-electronic receiver and with the photodetector circuit generating a **DC signal** responsive to an optical signal. The method comprises providing a current to voltage converter circuit operably coupled to the photodetector circuit with a comparator circuit operably coupled to the current to voltage converter circuit. The method further comprises: receiving by the current to voltage converter circuit from the photodetector

circuit the **DC signal**; generating by the current to voltage converter circuit a voltage signal in response to the **DC signal**; receiving by the comparator circuit from the current to voltage converter circuit the voltage signal; and generating by the comparator circuit from the voltage signal the LOS signal.

It is submitted that reasoning similar to claim 1 as stated above applies to claim 16. Specifically, as neither Geller, nor Lim, nor Lemon disclose a photodetector circuit being **AC coupled to an amplifier stage** and generating a **DC signal** used by a LOS signal generating apparatus to generate a LOS signal as in Applicants' claim 11, the combination of Geller, Lim, and Lemon cannot be said to disclose all of the limitations of Applicants' claim 11.

With regard to claim 21, Applicants claim an apparatus for generating a Loss Of Signal (LOS) signal for a photodetector circuit included in an opto-electronic receiver, the photodetector circuit **AC coupled to an amplifier stage** included in the opto-electronic receiver, the photodetector circuit generating a **DC signal** responsive to an optical signal. The LOS signal generating apparatus comprising: a current to voltage converter means operably coupled to the photodetector circuit for generating a voltage signal in response to the DC signal; and a comparator means operably coupled to the current to voltage converter means for generating the LOS signal in response to the voltage signal.

It is submitted that reasoning similar to claim 1 as stated above applies to claim 21. Specifically, as neither Geller, nor Lim, nor Lemon disclose a photodetector circuit being **AC coupled to an amplifier stage** and generating a **DC signal** used by a LOS signal generating apparatus to generate a LOS signal as in Applicants' claim 21, the combination of Geller, Lim, and Lemon cannot be said to disclose all of the limitations of Applicants' claim 21.

In the Office action, claims 14, 15, 19, 20, 24, and 25 stand rejected under 35 U.S.C. 103(a) as applied to their respective independent claims further in view of Kollanyi (US Patent 4,893,002). With regard to claims 14, 19, and 24, Kollanyi discloses a loss of optical input detector circuit 130 having a transistor 40 biased to act as a switch in response to the output of a voltage comparator circuit composed of transistors 20 and 25 (Kollanyi, col. 3, line 48 to col 4., line 11). It is respectfully submited that the modification of the switching control circuit of Geller in light of Lim and Lemon and further in light of Kollanyi does not disclose all of the limitations of Applicants' LOS circuit as claimed in dependent claims 14, 19, and 24. Specifically, the switching control circuit of Geller as modified by Kollanyi would not include the **separate ac and dc** coupled circuits of Applicants' claim 14, 19, and 24. Instead, Kollanyi discloses that the loss of optical input detector circuit receives an input from a post amplification and clock recovery circuit 120 indicative of the state of the amplified data signal of the optical detector. In contrast, Applicants' LOS circuit is part of a dc coupled circuit **separate** from the data signal. Therefore, as neither Geller, Lim, Lemon, nor Kollanyi disclose a **dc coupled circuit separate from an ac coupled circuit** as in Applicants' claims 14, 19, and 24, the combination of Geller, Lim, Lemon, and Kollanyi cannot be said to disclose all of the limitations of Applicants' claims 14, 19, and 24.

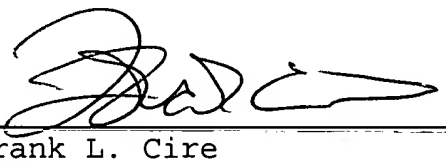
With regard to dependent claims 15, 20, and 25, each of these claims are dependent from their respective independent claims and therefore include all the limitations of their respective dependent claims and additional limitations in each dependent claim. Accordingly, claims 15, 20, and 25 are also allowable for the same reason set forth above for their respective independent claims as well as additional limitations recited.

As the remaining and amended claims are in condition for allowance, Applicants respectfully requests allowance of same.

Attached hereto is a marked-up version of the changes made to the above-identified application by the current amendment. The attached page is captioned "**Version with markings to show changes made**."

Respectfully submitted,

CHRISTIE, PARKER & HALE, LLP

By 

Frank L. Cire
Reg. No. 42,419
626/795-9900

FLC/flc

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims:

5. (Amended) A loss of signal circuit in an opto-electronic receiver, the opto-electronic receiver having a transimpedance amplifier ac coupled to a photodetector, the loss of signal circuit [~~of claim 4 wherein~~] comprising:

a current to voltage circuit dc coupled to the photodetector, the current to voltage circuit receiving a dc current signal generated by the photodetector and providing a dc voltage signal, the current to voltage circuit comprising a current mirror receiving the dc current signal and providing an intermediate dc voltage signal, the current mirror including transistors, and at least some of the transistors receive a substrate drive signal provided by a process and temperature sensor, the process and temperature sensor [~~comprises~~] comprising a resistor and a transistor, the resistor coupled to the drain of the transistor and the substrate drive signal being formed at the drain of the transistor; and

a comparator coupled to the current to voltage circuit, the comparator receiving the dc voltage signal and providing a loss of signal signal.

12. (Amended) [~~The apparatus of claim 11, wherein~~] An apparatus for generating a Loss Of Signal (LOS) signal for a photodetector circuit included in an opto-electronic receiver, the photodetector circuit being AC coupled to an amplifier stage included in the opto-electronic receiver, the photodetector circuit generating a DC signal responsive to an optical signal, the apparatus comprising:

a current to voltage converter circuit receiving the DC signal from the photodetector circuit, the current to voltage converter [~~further includes:~~]

circuit generating a voltage signal in response to the DC signal, the current to voltage converter comprising:

a current mirror circuit receiving the DC signal, the current mirror circuit generating an intermediate current signal in response to the DC signal;

a load resistor operably coupled to the current mirror circuit, the intermediate current signal flowing through the load resistor generating an intermediate voltage signal; and

a voltage buffer circuit receiving the intermediate ~~voltage signal, the voltage buffer circuit generating~~ the voltage signal[~~.~~]; and

a comparator circuit receiving the voltage signal from the current to voltage converter circuit, the comparator circuit generating a LOS signal in response to the voltage signal.

16. (Amended) A method [~~apparatus~~] for generating a Loss Of Signal (LOS) signal for a photodetector circuit included in an opto-electronic receiver, the photodetector circuit AC coupled to an amplifier stage included in the opto-electronic receiver, the photodetector circuit generating a DC signal responsive to an optical signal, the method comprising:

providing a current to voltage converter circuit operably coupled to the photodetector circuit;

providing a comparator circuit operably coupled to the current to voltage converter circuit;

receiving by the current to voltage converter circuit from the photodetector circuit the DC signal;

generating by the current to voltage converter circuit a voltage signal in response to the DC signal;

receiving by the comparator circuit from the current to voltage converter circuit the voltage signal; and

generating by the comparator circuit from the voltage signal a LOS signal.

17. (Amended) [~~The method of claim 16, the method further comprising:~~

~~providing~~] A method for generating a Loss Of Signal (LOS) signal for a photodetector circuit included in an opto-electronic receiver, the photodetector circuit AC coupled to an amplifier stage included in the opto-electronic receiver, the photodetector circuit generating a DC signal responsive to an optical signal, the method comprising:

providing a current to voltage converter circuit operably coupled to the photodetector circuit, the current to voltage converter circuit comprising a current mirror circuit operably coupled to a load resistor and a voltage buffer circuit [~~included in~~];

providing a comparator circuit operably coupled to the voltage buffer circuit of the current to voltage converter circuit;

receiving by the current mirror circuit of the current to voltage converter circuit from the photodetector circuit the DC signal;

generating by the current mirror circuit an intermediate current signal in response to the DC signal;

generating an intermediate voltage signal by flowing the intermediate current signal through the load resistor;

receiving by the voltage buffer circuit the intermediate voltage signal; [~~and~~]

generating by the voltage buffer circuit [~~the~~] a voltage signal [~~.~~];

receiving by the comparator circuit from the voltage buffer circuit the voltage signal; and

generating by the comparator circuit from the voltage signal a LOS signal.

22. (Amended) [~~The apparatus of claim 21, wherein the~~] An apparatus for generating a Loss Of Signal (LOS) signal for a photodetector circuit included in an opto-electronic receiver, the photodetector circuit AC coupled to an amplifier stage included in the opto-electronic receiver, the photodetector circuit generating a DC signal responsive to an optical signal, the apparatus comprising

current to voltage converter means [~~further includes:~~] operably coupled to the photodetector circuit for generating a voltage signal in response to the DC signal, comprising:

current mirror means for generating an intermediate current signal in response to the DC signal;

resistor means operably coupled to the current mirror means for generating an intermediate voltage signal in response to the intermediate current signal; and

voltage buffer means operably coupled to the resistor means for generating [~~the~~] a voltage signal from the intermediate voltage signal [~~.~~]; and

comparator means operably coupled to the current to voltage converter means for generating a LOS signal in response to the voltage signal.